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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/506,649	10/13/2004	Dictmar Erich Bernhard Lilie	04306/0201789-US0	4787

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EXAMINER	
KIM, TAE JUN	
ART UNIT	PAPER NUMBER
3746	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/24/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/506,649	LILIE, DIETMAR ERICH BERNHARD	
	Examiner	Art Unit	
	Ted Kim	3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 September 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *09/02/2004*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 11 is objected to because of the following informalities: "the second portion" lacks proper antecedent basis. Appropriate correction is required.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-3, 5-8, 10-12 are rejected under 35 U.S.C. 102(b) as being anticipated by WO 01/29444, see US 6,966,761 to Roke et al for citations. Roke et al teach a reciprocating compressor driven by a linear motor comprising a shell 30, within which are mounted: a reference assembly formed by a motor and a cylinder 8; a resonant assembly formed by a piston 11 reciprocating inside the cylinder, and by an actuating means 7 operatively coupling the piston 11 to the motor; and two spring means 13, 15 mounted to the resonant assembly and to the reference assembly and which are elastically and axially deformed in the displacement direction of the piston, characterized in that it comprises a mounting element 25 coupling an end of one spring means 13 to an end of the other spring means 15; and a coupling element 124 which has an end mounted to the piston 11 and an opposite end mounted to the mounting element 25, said mounting element carrying the ends of the two spring means 13, 15 coupled thereto and being

axially displaced together with the piston 11 and displaced freely and transversally to the displacement direction of the piston, said coupling element being constructed to transmit the axial forces between the piston and the mounting element and to minimize the application of radial forces to the piston (col. 3, lines 59+); characterized in that the coupling element is in the form of an elongated and relatively flexible rod 124; characterized in that the coupling element presents its ends respectively affixed to the mounting element and to the piston;

characterized in that the mounting element comprises a first annular portion (upper portion of 25 containing 124) coupling an adjacent end of one of the two spring means, and a second portion (bottom of 25) coupling an adjacent end of the other spring means, said first and second portions being axially spaced and affixed to each other and disposed on axially opposite sides of the resonant assembly, and part of the resonant assembly being disposed through said second portion; characterized in that the coupling element 7 is mounted to the second portion of the mounting element; and in which the piston presents a top portion and a tubular portion, characterized in that the coupling element 124 has part of its extension disposed within the body portion of the piston, having an end mounted to the top portion of the piston; characterized in that the actuating means carries an annular disc 7, against which is coupled the piston; characterized in that the second portion comprises a disc which couples, from an external face and coaxially to the axis of the piston, the coupling element; characterized in that the second portion (bottom

of 25) presents an elevated annular peripheral edge, which defines, from a lower face, a housing for an adjacent end of a spring means 13.

4. Claims 1-5 are rejected under 35 U.S.C. 102(b) as being anticipated by FR 743,398. FR '398 teaches a reciprocating compressor driven by a linear motor comprising a shell 1, within which are mounted: a reference assembly formed by a motor and a cylinder; a resonant assembly formed by a piston 11 reciprocating inside the cylinder, and by an actuating means 10 operatively coupling the piston to the motor; and two spring means 9 mounted to the resonant assembly and to the reference assembly and which are elastically and axially deformed in the displacement direction of the piston, characterized in that it comprises a mounting element 10 coupling an end of one spring means 9 to an end of the other spring means 9; and a coupling element 12 which has an end mounted to the piston and an opposite end mounted to the mounting element 10, said mounting element carrying the ends of the two spring means coupled thereto and being axially displaced together with the piston and displaced freely and transversally to the displacement direction of the piston ,said coupling element being constructed to transmit the axial forces between the piston and the mounting element and to minimize the application of radial forces to the piston; characterized in that the coupling element is in the form of an elongated and relatively flexible rod; characterized in that the coupling element presents its ends respectively affixed to the mounting element and to the piston; characterized in that the coupling element presents its ends respectively articulated to the mounting element and to the piston; characterized in that the coupling element has its

ends connected through a balljoint to the parts defined by the piston and the mounting element.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 2-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 01/29444, see US 6,966,761 to Roke et al for citations, applied above, and further in view of JP 2001-123949. Roke et al teach various aspects of the claimed invention including a flexible rod 124 but do not teach the use of articulated ball joints at the ends. JP '949 teaches a linear compressor with piston 5 and linear motor with an actuating means/annular disk 21. The ends of the flexible rod 25 are taught as having ball joints (see Fig. 3) as equivalent to the other types of articulated joints and enhance correction of the inclination of the piston with respect to the cylinder, thus reducing loss and improving efficiency and reliability. It would have been obvious to one of ordinary skill in the art to employ articulated ends at the rods, including ball joints, as taught by JP '949, in order to enhance correction of the inclination of the piston with respect to the cylinder, thus reducing loss and improving efficiency and reliability.

7. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over any of the rejections applying WO 01/29444, see US 6,966,761 to Roke et al for citations, as applied above, and further in view of Song et al (6,174,141). Roke et al teach various aspects of the claimed invention but do not teach the that the first and second portions of the mounting element are affixed to each other through rigid elements, which are angularly spaced to each other and mounted, with a radial gap, through the actuating means. Song et al (see Fig. 9) teach an analogous reciprocating compressor driven by a linear motor comprising a shell, within which are mounted: a reference assembly formed by a motor and a cylinder; a resonant assembly formed by a piston P reciprocating inside the cylinder, and by an actuating means 8 operatively coupling the piston to the motor; and two spring means 231, 232 mounted to the resonant assembly and to the reference assembly and which are elastically and axially deformed in the displacement direction of the piston, characterized in that it comprises a mounting element coupling an end of one spring means 231 to an end of the other spring means 232; said mounting element carrying the ends of the two spring means 231, 232 coupled thereto and being axially displaced together with the piston and displaced freely and transversally to the displacement direction of the piston, characterized in that the mounting element 19b, 212 comprises a first annular portion 8 coupling an adjacent end of one of the two spring means 232, and a second portion 212 coupling an adjacent end of the other spring means 231, said first and second portions being axially spaced and affixed to each other and disposed on axially opposite sides of the resonant assembly, and part of the resonant

assembly being disposed through said second portion; characterized in that the first and second portions of the mounting element are affixed to each other through rigid elements (screws in 213), which are angularly spaced to each other and mounted, with a radial gap, through the actuating means; characterized in that the actuating means carries an annular disc 19b, against which is coupled the piston; characterized in that the second portion comprises a disc; characterized in that the second portion presents an elevated annular peripheral edge, which defines, from a lower face, a housing for an adjacent end of a spring means. It would have been obvious to one of ordinary skill in the art to employ a plurality of disks for the mounting element of Roke et al, as taught by Song et al, in order to facilitate an equivalent connection that prevents noise due to friction.

8. Claims 1-5 are rejected under 35 U.S.C. 103(a) as being obvious over Tojo et al (6,231,310) in view of any of WO 01/29444, see US 6,966,761 to Roke et al for citations, Beale et al (5,525,845) and/or JP 2001-123949. Tojo et al (see Fig. 9) teach a reciprocating compressor driven by a linear motor comprising a shell 1, within which are mounted: a reference assembly formed by a motor and a cylinder 4; a resonant assembly formed by a piston 6 reciprocating inside the cylinder, and by an actuating means 8 operatively coupling the piston to the motor; and two spring means 9, 11 mounted to the resonant assembly and to the reference assembly and which are elastically and axially deformed in the displacement direction of the piston, characterized in that it comprises a mounting element 9 coupling an end of one spring means to an end of the other spring means; and a coupling element (radially between 26) which has an end mounted to the

piston 6 and an opposite end mounted to the mounting element 9, said mounting element carrying the ends of the two spring means 11, 9 coupled thereto and being axially displaced together with the piston and displaced freely and transversally to the displacement direction of the piston. Tojo et al do not teach the use of an elongated rod 9 is flexible and to minimizes the application of radial forces to the piston nor the use of articulated ball joints at the ends. Roke et al teach making the elongated rod flexible (col. 3, lines 59+). Beale et al teach making the elongated rod 15 flexible with articulated joints to center the piston and reduce wear (see abstract). JP '949 teaches a linear compressor with piston 5 and linear motor with an actuating means/annular disk 21. The ends of the flexible rod 25 are taught as having ball joints (see Fig. 3) as equivalent to the other types of articulated joints and enhance correction of the inclination of the piston with respect to the cylinder, thus reducing loss and improving efficiency and reliability. It would have been obvious to one of ordinary skill in the art to employ a flexible rod with articulated ends at the rods, including ball joints, as taught by any of Roke et al, Beale et al and/or JP '949, in order to enhance correction of the inclination of the piston with respect to the cylinder, thus reducing loss and improving efficiency and reliability and/or to center the piston and reduce wear.

9. Claims 6-12 are rejected under 35 U.S.C. 103(a) as being obvious over Tojo et al (6,231,310) in view of any of WO 01/29444, see US 6,966,761 to Roke et al for citations, Beale et al (5,525,845) and/or JP 2001-123949, as applied above, and further in view of Song et al (6,174,141). Tojo et al teach various aspects of the claimed invention but do

not teach the details of the claimed mounting element. Song et al (see Fig. 9) teach an analogous reciprocating compressor driven by a linear motor comprising a shell, within which are mounted: a reference assembly formed by a motor and a cylinder; a resonant assembly formed by a piston P reciprocating inside the cylinder, and by an actuating means 8 operatively coupling the piston to the motor; and two spring means 231, 232 mounted to the resonant assembly and to the reference assembly and which are elastically and axially deformed in the displacement direction of the piston, characterized in that it comprises a mounting element coupling an end of one spring means 231 to an end of the other spring means 232; said mounting element carrying the ends of the two spring means 231, 232 coupled thereto and being axially displaced together with the piston and displaced freely and transversally to the displacement direction of the piston, characterized in that the mounting element 19b, 212 comprises a first annular portion 8 coupling an adjacent end of one of the two spring means 232, and a second portion 212 coupling an adjacent end of the other spring means 231, said first and second portions being axially spaced and affixed to each other and disposed on axially opposite sides of the resonant assembly, and part of the resonant assembly being disposed through said second portion; characterized in that the first and second portions of the mounting element are affixed to each other through rigid elements (screws in 213), which are angularly spaced to each other and mounted, with a radial gap, through the actuating means; characterized in that the actuating means carries an annular disc 19b, against which is coupled the piston; characterized in that the second portion comprises a disc;

characterized in that the second portion presents an elevated annular peripheral edge, which defines, from a lower face, a housing for an adjacent end of a spring means. It would have been obvious to one of ordinary skill in the art to employ the mounting element, annular disc/actuating means, rigid elements, etc as taught by Song et al, in place of the integral mounting element using by Tojo et al, as an equivalent connection that prevents noise due to friction.

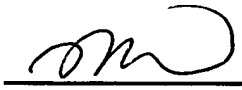
Contact Information

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Ted Kim whose telephone number is 571-272-4829. The Examiner can be reached on regular business hours before 5:00 pm, Monday to Thursday and every other Friday.

The fax number for the organization where this application is assigned is 571-273-8300.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ehud Gartenberg, can be reached at 571-272-4828. Alternate inquiries to Technology Center 3700 can be made via 571-272-3700.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). General inquiries can also be directed to the Patents Assistance Center whose telephone number is 800-786-9199. Furthermore, a variety of online resources are available at http://www.uspto.gov/main/patents.htm



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